

SOME UPPER TRIASSIC HEMIPTERA FROM MOUNT CROSBY, QUEENSLAND

J. W. EVANS

Honorary Associate, Australian Museum

Recent search in Upper Triassic fossil insect-bearing strata situated at Mount Crosby, Queensland, has yielded a considerable number of wings. In this article a report is furnished on those belonging to the sub-order Homoptera collected by Mr E. C. Dahms, Curator of Insects at the Queensland Museum; on an interesting wing of uncertain relationship found by Mr Dahms and on the wing of a Heteropteron discovered in the same strata by Mr B. V. Timms. The location where Mr Dahms's specimens were found is as follows: Upper bed, M. R. 910805–911805, Ipswich 1 mile military map.

HOMOPTERA

AUCHENORRHYNCHA

FULGOROIDEA

Tricrosbia gen. nov.

Small Upper Triassic Homoptera with a two-branched Rs which diverges from R slightly proximally to its centre. M1+2 is a single vein. M3 and M4 are apically separate and a third vein arises from their common stem. An enclosed cell, situated proximally to the initial branching of M, is bounded laterally by a pair of cross-veins m-cua. CuA, which terminates proximally at the base of the claval suture, has no association with the base of M. In the clavus the anal veins are apically fused into a single vein.

TYPE-SPECIES: *Tricrosbia minuta* sp.nov.

Tricrosbia minuta sp.nov.

(Fig. 1)

HOLOTYPE: tegmen, Mt Crosby, upper bed, M.R. 910805-911805, Ipswich 1 mile military map, coll. E. Dahms, Q.M. F6520. Length of tegmen, 3.2 mm; greatest width, 1.3 mm. Surface of tegmen smooth.

DESCRIPTION: The features distinguishing the species are, for the present, those given in the generic description.

Tricrosbia minuta is assigned to the Fulgoroidea, rather than to the Cicadelloidea for the following reasons: although an enclosed cell is a common feature of the tegmina of Mesozoic cicadelloids, it invariably lies within the arms of M, and not, as occurs in *T. minuta* outside them. Then, while certain extinct and extant cicadelloids have a Y-vein in the clavus and others have accessory veins associated with both Rs and M, the combination, in a single wing, of these three particular characteristics is unknown in this superfamily. In the Fulgoroidea, on the other hand, a Y-vein in the clavus is of universal occurrence and branches of other veins, in excess of the basic Homopterous number, are usually developed.

CERCOPOIDEA

MATERIAL: Queensland Museum: F6493, *Dysmorphoptiloides elongata* (fig. 2); F6504, fragment of tegmen of *Trifidella perfecta* Evans, 1956; F6498 (fig. 4A); F6542 (fig. 4B); F6507, small fragment, similar to part of tegmen illustrated in fig. 4A.

Five tegmina, or fragments of tegmina, are attributed to the Cercopoidea. Three of these are illustrated.

The most complete specimen is a tegmen of *Dysmorphoptiloides elongata* Evans, 1956, made notable by the retention of the previously unknown clavus (fig. 2). The two others illustrated (fig. 4A, B) do not seem to belong to described Triassic cercopoids, but are too fragmentary to merit description and naming. As well as on venational grounds, they are considered as belonging to the Cercopoidea because of their rugosity. The fragment illustrated in fig. 4A is 7 mm in length; the one in fig. 4B, 8 mm.

STERNORRHYNCHA

APHIDOIDEA

Crosaphis gen. nov.

Small Homoptera with broad wings in which M is basally incorporated in the same vein as Rs and in such a way that M1+2 and M3+4 diverge separately from their common

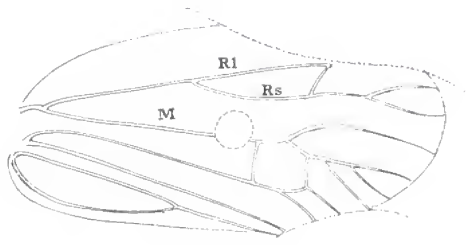


FIG. 1: *Tricrosbia minuta*, tegmen.

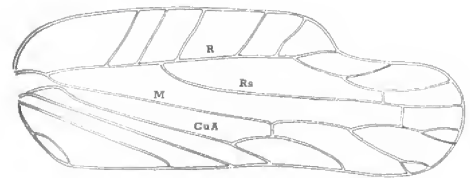


FIG. 2: *Dysmorphoptiloides elongata*, tegmen.

stem with Rs. CuA, which has two branches, meets R proximally at an acute angle. A clavus is absent and anal veins are lacking.

TYPE-SPECIES: *Crosaphis anomala* sp. nov.

***Crosaphis anomala* sp. nov.**

(Fig. 3A)

HOLOTYPE: wing, Mt Crosby, upper bed, M.R. 910805–911805, Ipswich 1 mile military map, coll. E. Dahms, Q.M. F6508a. Length of wing, 3.5 mm; greatest width, 1.5 mm.

DESCRIPTION: The features distinguishing the species are, for the present, those given in the generic description.

The reason this unusual wing is regarded as that of an aphidoid rather than of a psylloid, is that in the last-named group M is invariably proximally associated with CuA, and never, as in aphidoids, with Rs.

It resembles the forewing of *Triassoaphis cubitus* Evans, 1956, from the Mt Crosby beds, in having a possible Sc; a two-branched M1+2 and a single-branched M3+4 which is proximally incorporated in the same vein as Rs; a two-branched CuA and no clavus. It differs from *T. cubitus* in shape, being considerably broader proximally; in having a less strengthened R1, which does not extend so near to the apex of the wing; in having the base of M, as far as its initial branching into M1+2 and M3+4, incorporated in Rs; a considerably shorter CuA.

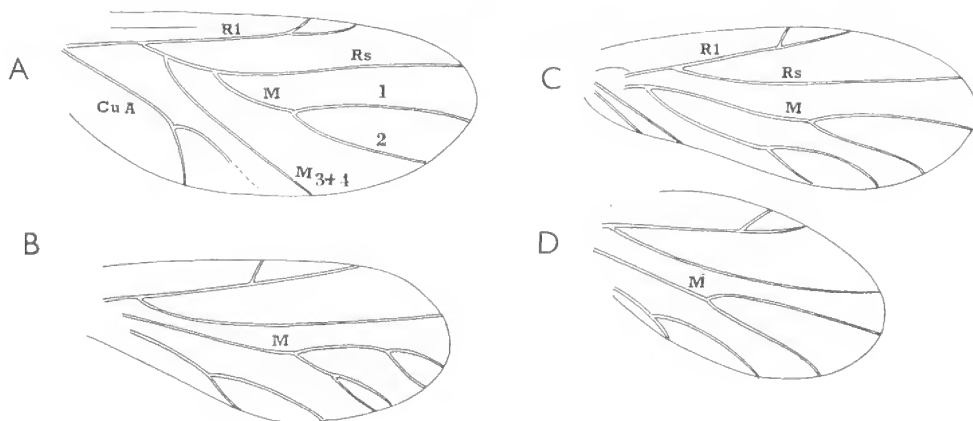


FIG. 3: Wings of A, *Crosaphis anomala*; B–D, *Triassothea analis*.

In shape, though not in venational characteristics, the wing of *C. anomala* resembles the forewing of the more ancient *Kaltanaphis permianensis* Becker-Migdisova (illustrated in Becker Migdisova and Aizenberg, 1962, fig. 566), more closely than it does that of *T. cubitus*.

PSYLLOIDEA

Triassothea analis Evans

(Fig. 3B-D)

Triassothea analis Evans, 1956, p. 236.

In the collection of fossil Homoptera assembled by Mr Dahms there are no less than 53 wings attributable to this species. At the time of its description it was mentioned that it was the sole psylloid represented in Mt Crosby strata, in contrast to the Upper Permian fossil insect beds at Belmont, New South Wales, which have yielded a rich fauna of these insects.

A forewing of *T. analis* (F6523; length, 3.8 mm) is illustrated in fig. 3C for comparison with a fragment of a presumed hind wing of the same species (fig. 3D, F6524; length, 2.4 mm). Both wings occur on the same rock specimen.

Also illustrated (fig. 3B, F6515; length, 3 mm), is the forewing of a psylloid which is assigned to *T. analis*, though differing from all other known specimens in having a four-branched M. No previously recorded Permian or Triassic Psylloidea have more than a three-branched M, hence it is presumed the condition shown in the figure is an anomalous one.

FRAGMENTS AND INCERTAE SEDIS

Fragments of five wings are illustrated in fig. 4. Two of these have previously been mentioned and ascribed to the Cercopoidea (4A, B). Of the remainder, one (4C) is a clavus while the two others are supposed to be parts of hind wings.

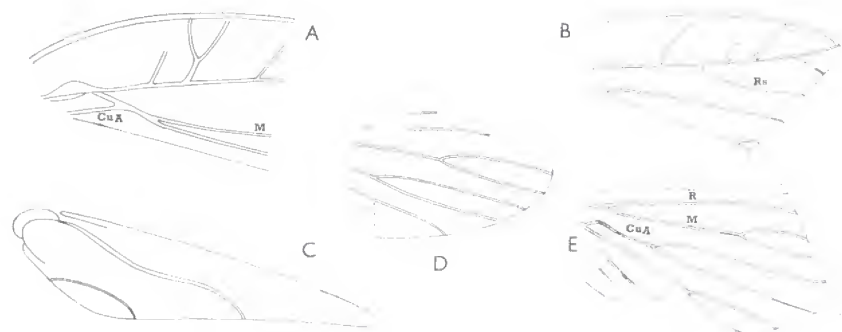


FIG. 4: A-C, fragments of tegmina of Homoptera; D, E, incertae sedis.

The clavus (F6491; length, 7 mm), which is finely punctate, is illustrated because of its excellent state of preservation and the paucity of records of this part of tegmina of Upper Triassic Homoptera.

The fragment (F6540; length, 4 mm) illustrated in fig. 4D is too incomplete to need discussion.

The other (F6483; length, 3.5 mm) (fig. 4E), is of greater interest since as well as being almost complete it presents certain puzzling features. If the veins have been correctly labelled in the figure, then the posterior cubitus is two-branched and such a condition of CuP is unknown in the Homoptera.

A search of the literature discloses that this wing has a certain superficial resemblance, especially in regard to CuP, to the wing of a Miomopteran, *Tychtodelopterum relictum* Martynova, (Martynova, 1962). If a different interpretation of its venation is adopted, then even closer matching can be established with the wing of another Miomopteran, *Delopterum incertum* (Martynov), (Martynova, 1962). Such an alternative would involve the vein labelled M in the figure becoming Rs, and CuA becoming M. The posterior forked vein would then become CuA. The reason the above interpretation of the venation of fig. 4E is not accepted and the wing neither named, nor assigned to the Miomoptera, is because it is thought a single wing fragment provides insufficient evidence for recording a representative of a northern hemisphere Permian insect order from Australian Upper Triassic strata.

It has been suggested that the Miomoptera lie close to the base of the Hemipteroid stem (Riek, 1970). Accordingly, it might be expected that some fossil wings might have venational features with characteristics of both orders. A study of Miomoptera remains illustrated by Martynova (1962), lends no support to this suggestion for not only did insects belonging to this order have a very different pattern of venation from the Hemiptera, but they possessed cerci. Accordingly, if the two orders had a common origin their divergence must have taken place before the time the Hemiptera acquired their very special characteristics. This being so, there seems no good reason why the Miomoptera, any more than several other insect orders, should be regarded as one of the 'Hemipteroid orders'.

HETEROPTERA

Heterochterus gen. nov.

Upper Triassic Heteroptera from Mt Crosby, Queensland, with a well defined costal fracture in the forewing situated at approximately one-third of its length from its base. R multi-branched, terminating near the point of commencement of the apical appendix. M, which diverges from its common stem with R at the angle of the costal fracture, with two equal branches. M and CuA linked by three cross-veins. Marginal vein meeting the claval suture at an acute angle. Clavus unknown.

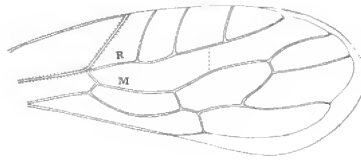


FIG. 5: *Heterochterus timmsii*, forewing.

Resembling *Heterojassus* Evans, 1961, from the same horizon, in general facies: differing in having an additional cross-vein m-cua, a more extensive appendix, and in being broader apically.

TYPE-SPECIES: *Heterochterus timmsii* sp. nov.

***Heterochterus timmsii* sp. nov.**

(Fig. 5)

HOLOTYPE: wing, Mt Crosby, coll. B. V. Timms, presented by Department of Entomology, University of Queensland, Q.M. F6473. Length, 4.3 mm; greatest width, 1.6 mm.

DESCRIPTION: The features distinguishing the species are, for the present, those given in the generic description.

The above wing is regarded as that of an insect belonging to the sub-order Heteroptera because of the presence of a costal fracture; the lack of Rs; and the abrupt termination of the marginal vein at the apex of the claval suture. The 'costal fracture', which is a characteristic of certain Heteroptera, but unknown in the Homoptera, is a transverse line of weakness which extends from the costal margin of the hemelytron as far as vein $R+M$ (Evans, 1950, p. 246).

In the paper referred to above the forewing of a recent ochterid is illustrated (*Ochterus marginatus* Latreille; fig. 8) which, as well as closely resembling that of *H. timmsii* in general appearance, has all the features listed above as being peculiarly Heteropterous in nature. In the Ochteridae the clavus is reduced and anal veins are lacking, but in certain other Recent Heteroptera, such as the Dipsocoridae, the marginal vein is the trans-claval continuation of the apically fused anal veins.

ACKNOWLEDGMENTS

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